

On the occurrence of the Spiny Lobster, *Panulirus dasypus* (H. Milne- Edwards) in Bombay waters, with a note on the Systematics of Bombay Lobsters¹

BY

B. F. CHHAPGAR, M.SC. AND S. K. DESHMUKH, M.SC.
Taraporevala Marine Biological Station, Bombay

(With one text-figure)

During their investigations on the biology of spiny lobsters occurring in Bombay, the authors came across three species of lobsters. One of these was thought, at first, to be a colour variation of the Common Lobster *Panulirus polyphagus* (Herbst). Detailed examination, however, revealed that it was a different species, the most significant character for differentiation from hitherto recorded species (at Bombay) being the presence of transverse grooves on the abdominal segments. It was then identified as *Panulirus dasypus* (H. Milne-Edwards).

The record of an additional species necessitated a review of the taxonomy of the lobsters of Bombay. While doing so, it was found that there is considerable confusion in their identification. For example, the *Panulirus fasciatus* of Fabricius and Milne-Edwards is actually *Panulirus polyphagus* (Herbst), while the *Panulirus fasciatus* of De Haan is *Panulirus versicolor* (Latreille). Rai (1933) and Chopra (1939), both of whom have previously recorded these species from Bombay, have given them different names. Thus Rai has recorded them along the Bombay-Sind coast as *Panulirus ornatus* var. *decoratus* Heller cf. *P. versicolor* (Latr.), and *Panulirus fasciatus* (Fabr.) respectively, stating that the former is the more common. Chopra states that the common species of the Bombay coast is *Panulirus ornatus*, while *Panulirus polyphagus* (= *Panulirus fasciatus*)

¹ Communicated by the Director of Fisheries, Maharashtra State, Bombay.

occurs commonly along the eastern coast of India. Actually, *P. polyphagus* is the prevalent species off the Bombay coast, *P. versicolor* being the rarest, although both Rai and Chopra have mentioned otherwise.

Similarly, there is confusion in the identification of *P. versicolor* and *P. ornatus*. Barnard (1950), following de Man (1916), gives as the distinguishing character of *P. versicolor* the presence of a small single-jointed flagellum on the exopodite of the second maxillipede, whereas in *P. ornatus* the exopodite is without a flagellum, being only tipped with a small tuft of setae. Holthuis (1947), on the other hand, states that 'the presence of one or more segments of the flagellum of the exopodite of the second maxillipede in *P. versicolor* and the total absence of a flagellum in *P. ornatus* is rather variable in the former species, where it sometimes is absent too'. As such, dependence on the key devised by Barnard would lead to incorrect identification as regards these two species.

Classification of different species has been based, among other characters, on the relative lengths of the antennular and antennal peduncles and the walking legs. The authors, however, have found these characters to vary in individuals of different sizes, and hence these characters cannot be relied upon. The salient features of the three species of lobsters occurring at Bombay are given below. As stated by Holthuis, however, the most obvious character for identification is the colour pattern, and particular attention has been paid here to prepare a detailed colour description.

KEY TO IDENTIFICATION OF LOBSTERS OF BOMBAY

1. Abdominal somites with transverse grooves (interrupted medianly) ... *P. dasyopus* (H. Milne-Edwards)
- Abdominal segments without transverse grooves¹ ... 2
2. Exopodite of second maxillipede with many-jointed flagellum ... *P. polyphagus* (Herbst)
- Exopodite of second maxillipede with either a small single-jointed flagellum, or without a flagellum ... *P. versicolor* (Latreille)

¹ Young specimens of *P. polyphagus* and *P. versicolor* may sometimes show traces of grooves.

DESCRIPTION OF SPECIES

Panulirus polyphagus (Herbst)

Cancer (Astacus) polyphagus Herbst, *Vers. Naturg. Krabben Krebse* 2 : 90 (1793).

Senex ornatus Ortmann, *Zool. Jahrb. Syst.* 6 : 34 (1891).

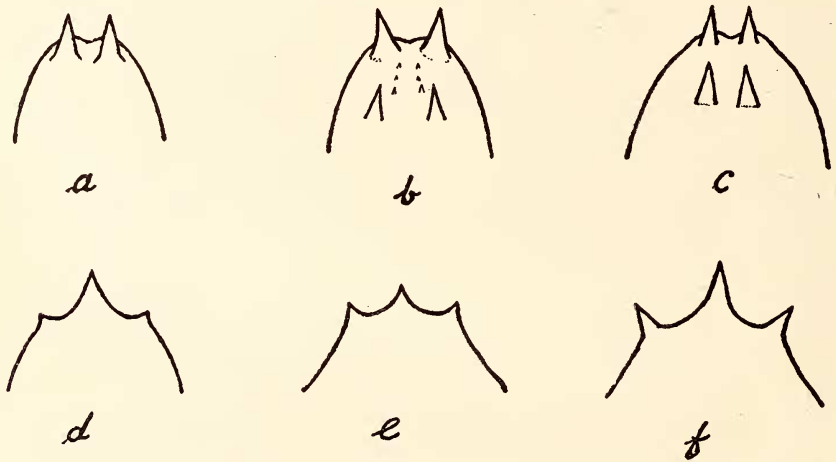
Palinurus fasciatus Fabricius, *Suppl. Ent. syst.* : 401 (1798).

Panulirus orientalis Doflein, *S. B. Bayer Akad. Wiss.* 30 : 130 (1900).

Panulirus fasciatus Milne-Edwards, *Hist. nat. Crust.* 2 : 295 (1837); Gavino, *Viaggio Circumnav. Caracciolo* : 6 (1888); Annandale, *J. Bombay nat. Hist. Soc.* 18 : 927 (1908); Rai, *ibid.* 36 : 893 (1933).

Panulirus polyphagus Nobili, *Boll. Mus. Zool. Anat. comp. Torino* 18 (452) : 14 (1903); Borradaile, *Fauna Geogr. Mald. Laccad.* 2 (3) : 754 (1904); Chopra, *J. Bombay nat. Hist. Soc.* 41 : 223 (1939); Holthuis, *Temminckia* 7 : 136 (1947).
Panulirus Powell, *J. Bombay nat. Hist. Soc.* 18 : 360 (1908).

The antennular plate (text-fig. *a*) bears only one pair of spines, situated far forward. The median spine on the fused coxicerites of the antennae (text-fig. *d*) is much stronger and projects far in front of the two minute lateral ones. All three spines have wide bases.



Text-Figure

Antennular plates of : (a) *Panulirus polyphagus*, (b) *P. dasypus*, and (c) *P. versicolor*. Fused coxicerites of the antennae of : (d) *P. polyphagus*, (e) *P. dasypus*, and (f) *P. versicolor*.

The dimensions of a medium-sized individual are :

total length	... 250 mm.
length of carapace	... 110 mm.
length of supra-orbital spine	... 16.5 mm.

The cephalothorax and abdomen have a muddy-brown colour. There is a row of six white spots on each of the lateral regions of

the carapace—the anteriormost spot being larger than the rest. Small spines arise from these spots. From the postero-lateral corner of the carapace to the region of the mouth parts runs a white stripe, terminating in a broad white patch; another white stripe starts from the same place, running along the bases of the legs. The spines on the carapace have a brown base with yellowish tips. The antennular flagella are alternately banded crimson and white.

Each of the abdominal somites has a brown transverse band on the hind margin, with a narrow cream-coloured stripe running through it. This stripe in the first segment may be broken. The hinder third of the telson and uropods has a reddish tinge. The telson, uropods, and abdominal appendages are bordered with cream-coloured lines. The legs are brownish red, cream at the joints.

This lobster is locally known as 'shevand'.

DISTRIBUTION. Mauritius, India, Malay Archipelago, Indochina, Japan, and Polynesia. It has been previously recorded from Bombay by Nobili (1903), Annandale (1908), Powell (1908), Rai (1933), and Chopra (1939).

Panulirus dasyopus (H. Milne-Edwards)

Panulirus dasyopus H. Milne-Edwards, *Hist. nat. Crust.* 2 : 300 (1837).

Panulirus dasyopus Henderson, *Trans. Linn. Soc. Lond., Zool.*, (ser. 2) 5 : 433 (1893); Thurston, *Bull. Madras Govt. Mus.* 3 : 120 (1895); de Man, *Siboga Exped. Rep.* 39a2:48 (1916); Gravely, *Bull. Madras Govt. Mus.* (ser. 2) 1:138 (1927); Holthuis, *Temminckia* 7 : 134 (1947); Barnard, *Ann. S. Afr. Mus.* 38 : 549 (1950).

Senex dasyopus Ortmann, *Zool. Jahrb. Syst.* 6 : 33 (1891).

There are four spines on the antennular plate (text-fig. *b*), the posterior two being about $\frac{2}{3}$ the length of the anterior two and being a little less distant from each other. A double row of spinules is present between them. The three spines on the fused coxicerites of the antennae (text-fig. *e*) are minute, sub-equal, and placed in a line.

The exopodites of the second maxillipedes hardly reach the extremity of the merus. The first pair of legs are much stouter than in the other two species.

Two spines are present in the middle line of the gastric region, just in front of the cervical groove, and placed behind one another. The abdominal pleura end almost horizontally.

The dimensions of a medium-sized individual are:

total length	... 250 mm.
length of carapace	... 112 mm.
length of supra-orbital spine	... 21.5 mm.

The cephalothorax and abdomen are of a bluish grey colour, speckled throughout with minute whitish spots. There is a row of six to seven white spots (from which spines arise) on each of the lateral regions of the carapace, the anteriormost being larger than the rest. From the postero-lateral corner of the carapace to the region of the mouth parts runs a blue line, terminating in a broad white patch; another white line starts from the same place and runs parallel to the bases of the legs. The spines on the carapace are light brown with yellowish tips. The antennular flagella are alternately banded brown and white. There is a blue line between the eyes, on the antennular plate, and on the branchio-cardiac groove.

Two lateral white spots are present on each abdominal segment. The hinder third of the telson and uropods have a reddish tinge. The telson, uropods, and abdominal appendages are bordered with cream-coloured lines. The legs are yellowish brown, blotched with irregular cream spots.

DISTRIBUTION. From the western Indian Ocean to Japan and Malay Archipelago.

Panulirus versicolor (Latreille)

Palinurus versicolor Latreille, *Ann. Mus. Hist. nat. Paris* 3 : 394 (1804).

Palinurus taeniatus Lamarck, *Hist. nat. Anim. sans Vert.* 5 : 211 (1818).

Palinurus fasciatus De Haan, *Fauna Japonica, Crust.* : 159 (1841).

Palinurus (*Panulirus*) *ornatus* var. *decoratus* Heller, *Reise Novara Zool.* 2 : 99 (1865).

Panulirus demani Borradaile, *Willey's Zool. Results* 4 : 418 (1899).

Panulirus ornatus Rathbun, *Proc. U. S. Nat. Mus.* 38 : 560 (1910); Chopra, *J. Bombay nat. Hist. Soc.* 41 : 224 (1939); var. *decoratus* de Man, *Siboga Exped. Rep.* 39a2 : 54 (1916); Rai, *J. Bombay nat. Hist. Soc.* 36 : 893 (1933); var. *laevis* de Man, *Siboga Exped. Rep.* 39a2 : 55 (1916).

Panulirus versicolor de Man, *Siboga Exped. Rep.* 39a2 : 55 (1916); Holthuis, *Temminckia* 7 : 142 (1947); Barnard, *Ann. S. Afr. Mus.* 38 : 553 (1950).

Senex ornatus var. *laevis* Lanchester, *Proc. Zool. Soc. Lond.* : 557 (1901).

The antennular plate (text-fig. c) bears two pairs of spines. The posterior pair are slightly smaller and more closely situated than the anterior pair; there are, very rarely, two denticles in front of and between them. The three spines on the fused coxicerites of the antennae (text-fig. f) are large and sub-equal, the median one being slightly in advance of the lateral ones.

The supra-orbital spines are much longer and stronger than in the preceding two species. The spines at the antero-lateral angles

of the carapace have their tips directed slightly outward. The spines between these and the supra-orbital spines are also directed outward, not forward. The three sub-median pairs of spines in front of, and the three pairs behind, the cervical groove form a parallel series. The groove along the posterior margin of the carapace is not of uniform width, but widens in the median part.

The dimensions of a medium-sized individual are:

total length	... 256 mm.
length of carapace	... 108 mm.
length of supra-orbital spine	... 28 mm.

The cephalothorax and abdomen have a green ground colour. The carapace is marbled with confluent black spots and blotches, edged with white. These spots continue on to the supra-orbital spines. The antennules (including the flagella) have alternate black and yellowish-white longitudinal stripes. The antennal peduncles are pink, their spines having black bases with lemon-green tips. The flagella have green and white longitudinal stripes. The walking legs have white stripes on a black background.

Each of the abdominal somites has a black transverse band on the hind margin, with a narrow white stripe running through it. The borders of the telson, uropods, and abdominal appendages are fringed with white, while the abdominal appendages also have a white central stripe. The spinules on the telson and uropods have a green base with golden tips.

This lobster is locally known as 'manjri shevand'.

DISTRIBUTION. From the east coast of Africa to Japan and Polynesia. It has been previously recorded from Bombay by Rai (1933) and Chopra (1939).

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